
CHAPTER 12: ENVIRONMENTAL MITIGATION

Environmental mitigation, in reference to transportation planning, refers to the methods, strategies or actions to reduce the negative effects, direct or indirect, of a transportation project on the MITW's environmental and cultural resources. Planned projects are identified in relation to environmental and cultural resources and a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the projects will ensue. This is a system wide analysis that is the first step to mitigation.

The MITW has conducted extensive system level analysis of the relationship between the MITW Long Range Transportation Plan projects and various natural features and resources.

Environmental features and resources analyzed include:

- Steep Slopes
- Mining Sites
- Bedrock
- Farmland
- Groundwater
- Groundwater Contamination Susceptibility
- Wellhead Protection Areas
- Water Basins, Watersheds, Lakes, Ponds, Rivers and Streams
- Wetlands
- Floodplains
- Hazardous, Contaminated Sites and Landfills
- Woodlands or Sustained Yield Forestlands
- Rare, Threatened and Endangered Species and Natural Communities
- Exotic and Invasive Species
- Parks Open Space
- Recreational Trails
- Environmental Corridors
- Air Quality
- State and National Registry of Historic Places
- Architecture and History Inventory
- Archaeological Sites Inventory
- Tribal Historic Preservation Office
- Wisconsin Historic Markers
- Museums
- Cemeteries

The MITW Long Range Transportation Plan includes projects that are both committed and planned. For each environmental attribute or set of attributes listed above, a GIS map was prepared showing the MITW Long Range Transportation Plan projects and the proximity to each resource featured. To clarify data, an overall map of the MITW Reservation showing projects and environmental features is followed by larger scale maps for each of the environmental maps that have been generated. Where projects or features are not in proximity to one another, or if there is no data, these expanded map views have been omitted, since they would show nothing.

It should be emphasized that the MITW role in examining issues related to environmental mitigation is to scan system level issues – this is not a project level environmental impact document, which requires field work and specific analysis under the National Environmental Policy ACT (NEPA). Rather the planning regulations require system level or regional analysis to look at cumulative effects of all projects (not those of individual projects) from a high level – which may streamline later project level or site specific analysis to the extent they may flag or act as “an early warning system” to both transportation and resource agencies of issues which may need to be considered in later project level analysis, but more importantly, to assure that the planning and programming process as a whole considers what the long term environmental mitigation issues are for the MITW in light of future plans.

The committed and planned transportation projects are taken directly from the TTIP. The following tables list the transportation project implementation year, name, description and total estimated cost from the 2012 to 2017 TTIP. The ID numbers in **Tables 12-1**. correlate to the ID numbers in **Exhibits 12-1 to 12-5**. Those TTIP projects that are related to planning or an initiative are not mapped and the ID is listed as Not Applicable (NA).

Table 12-1. Tribal Transportation Improvement Projects (2012-2017)

ID	Year	Project	Description	Total Estimated Cost
1	2012	West Branch Road (County Portion)	Pulverize and shape City portion of road starting from Keshena Falls Road and ending just north of West Branch Cemetery Road	\$438,000
2	2012	Neopit Road and Street Repair Initiative	Upgrading and repair of existing Neopit streets as funds allow and which will include the following roads located in Dog Town area: North 1st, 2nd, 3rd Streets, Store St., Water St. and North St.	\$333,000
NA	2012	Standing Pines Drive	Direct Service Agreement Projects	\$3,000
NA	2012	Middle Village Cemetery Road	Direct Service Agreement Projects	\$3,000
NA	2012	Upper Bass Lake Road	Direct Service Agreement Projects	\$2,000
NA	2012	County Hwy B	Direct Service Agreement Projects	\$1,000
NA	2012	Big Jim Zoar Road	Direct Service Agreement Projects	\$3,000
NA	2012	Bear Trap Falls Road	Direct Service Agreement Projects	\$3,000
NA	2012	Sonny Pat Road (aka Spears Road)	Direct Service Agreement Projects	\$3,000
NA	2012	Hillcrest Lane	Direct Service Agreement Projects	\$2,000
NA	2012	South Branch Center Road Parking Lot	Direct Service Agreement Projects	\$2,000
NA	2012	Zoar Ceremonial Road Parking Lot	Direct Service Agreement Projects	\$2,000
NA	2012	Ponfil Road	Direct Service Agreement Projects	\$3,000
NA	2012	Fair Grounds Road & Upper Pow Wow Area	Direct Service Agreement Projects	\$3,000
NA	2012	Business Center Road (Parking Lot)	Direct Service Agreement Projects	\$3,000
3	2012	Survey & R-O-W Perfection Initiative	Survey, and Prefect Right Of Way (ROW) for various roads on the Menominee Indian Reservation, and listed on the TTP Inventory	\$5,000
4	2012	Sidewalk/Parking Lot Initiative and Repair	Adding new or repair of sidewalks/parking lot in various location: Maehnowesekiyah Diversion Center Parking Lot; Head Start Loop Road Parking Lot; Day Care Center Parking Lot; and Tribal Office Lower Level Parking Lot	\$199,600

Table 12-1. Tribal Transportation Improvement Projects (2012-2017) - Continued

ID	Year	Project	Description	Total Estimated Cost
5	2012	New Street Light Initiative and Repair	Addition of new street lighting to various locations and repairs: Head Start Loop Road Parking Lot Lighting; and Maehnowesekiyah Diversion Center Parking Lot Lighting	\$60,000
6	2012	TTP Transportation Planning	(5% TTP Construction Funds for TTP Transportation Planning)	\$82,200
7	2012	TTP Road Maintenance	(25% TTP Construction Funds for TTP Road Maintenance)	\$411,000
8	2012	TTP Transit	(5% TTP Construction Funds for TTP Transit)	\$82,200
9	2013	West Branch Road Phase II (BIA-Tribe Portion)	Shape and re-gravel road starting from just north of WB Cemetery Road and ending at the intersection of Camp 16 & Camp 24 roads	\$340,000
10	2013	Neopit Road and Street Repair Initiative	Upgrading and Repair of existing Neopit streets as funds allow and which will include the following roads in the White City Area: Cottage Ave, White Ave, Kohls St., Church St., Shawpokasic St., & A'Kwine'Me St. Sewer Circle Area: River St. Lawe Ave., James St. (currently gravel)	\$250,424
NA	2013	Upper Bass Lake Road (Phase III / F5844019)	Direct Service Agreement Projects	\$2,000
NA	2013	South Branch Center Parking Lot (F5871105)	Direct Service Agreement Projects	\$6,000
NA	2013	Big Jim Zoar Road (F5844008)	Direct Service Agreement Projects	\$11,000
NA	2013	Otratovec Loop Road	Direct Service Agreement Projects	\$3,000
NA	2013	Sonny Pat Road (F5844023)	Direct Service Agreement Projects	\$3,000
NA	2013	Zoar Ceremonial Center Parking Lot (F5873505)	Direct Service Agreement Projects	\$6,000
NA	2013	Business Center Road (Parking Lot) F5844025	Direct Service Agreement Projects	\$7,000
NA	2013	Rice Bed Road	Direct Service Agreement Projects	\$3,000
11	2013	Survey & R-O-W Perfection Initiative	Survey, and Prefect R-O-W for various roads on the Menominee Indian Reservation, and listed on the TTP Inventory	\$3,000

Table 12-1. Tribal Transportation Improvement Projects (2012-2017) - Continued

ID	Year	Project	Description	Total Estimated Cost
12	013	Sidewalk/Parking Lot Initiative and Repair	Adding new or repair of sidewalks/parking lot in various locations: Our Childrens Rd, and Various Keshena locations, Keshena Senior Center Parking Lot, and CBRF Parking Lot	\$119,600
13	2013	New Street Light Initiative and Repair	Addition of new street lighting to various locations and repairs throughout Keshena, Neopit, and Middle Village (Upgrade to LED)	\$71,000
14	2013	TTP Transportation Planning	(5% TTP Construction Funds for TTP Transportation Planning)	\$63,500
15	2013	TTP Road Maintenance	(25% TTP Construction Funds for TTP Road Maintenance)	\$317,300
16	2013	TTP Transit	(5% TTP Construction Funds for TTP Transit)	\$63,500
17	2014	County Hwy. G	Resurface from Koonz Lake Rd and re-align intersection at Hwy 47 for a safer and better visibility when entering highway	\$22,350
18	2014	Neopit Road and Street Repair Initiative	Upgrading and Repair of existing Neopit streets as funds allow and which will include the following roads in the Zoar Area : Kis Ka Ha Quon Road, Pa Yae Wa Say Road, Wapun Road, Ceremonial Road, and Ackley Road (currently gravel)	\$458,000
NA	2014	Direct Service Agreement Projects	Complete List of Direct Service projects TBD next year	\$100,000
19	2014	Survey & R-O-W Perfection Initiative	Survey, and Prefect R-O-W for various roads on the Menominee Indian Reservation, and listed on the TTP Inventory	\$3,000
20	2014	Sidewalk/Parking Lot Initiative and Repair	Adding new or repair of sidewalks/parking lot in various location: Housing Parking Lot, LEC Parking Lot, & South Branch Fire Station Parking Lot	\$157,374
21	2014	New Street Light Initiative and Repair	Addition of new street lighting to various locations and repairs	\$84,300
22	2014	TTP Transportation Planning	(5% TTP Construction Funds for TTP Transportation Planning)	\$63,500
23	2014	TTP Road Maintenance	(25% TTP Construction Funds for TTP Road Maintenance)	\$317,300
24	2014	TTP Transit	(5% TTP Construction Funds for TTP Transit)	\$63,500
25	2015	Standing Pines Drive (F5844002) & STH 47/55 project	Upgrading and by adding a Round About at intersection this will be a project funded by both WisDOT and BIA/Tribal	\$330,000

Table 12-1. Tribal Transportation Improvement Projects (2012-2017) - Continued

ID	Year	Project	Description	Total Estimated Cost
36	2015	Old South Branch Road	Shape and re-gravel road starting from Rushes Lake road and ending at the intersection of County M Road	\$179,024
NA	2015	Direct Service Agreement Projects	Complete List of Direct Service projects TBD next year	\$70,000
27	2015	Survey & R-O-W Perfection Initiative	Survey, and Prefect R-O-W for various roads on the Menominee; Indian Reservation, and listed on the TTP Inventory	\$2,000
28	2015	Sidewalk/Parking Lot Initiative and Repair	Adding new or repair of sidewalks/parking lot in various location	\$55,000
29	2015	New Street Light Initiative and Repair	Addition of new street lighting to various locations and repairs	\$19,000
30	2015	TTP Transportation Planning	(5% TTP Construction Funds for TTP Transportation Planning)	\$63,500
31	2015	TTP Road Maintenance	(25% TTP Construction Funds for TTP Road Maintenance)	\$317,300
32	2015	TTP Transit	(5% TTP Construction Funds for TTP Transit)	\$63,500
33	2015	STH 47 - Shawano County Line to Duquaine Rd	Reconstruction/preservation -It is proposed to do an urban reconstruct of this segment of roadway. The project will include the extension of four lanes to the south. Includes a roundabout for the entrance to the casino and reduces the lanes to 2 with a center left turn lane.	\$2,000,000
34	2015	STH 47 and CTH G Intersection - Re-align roadway	The proposed improvement involves the relocating the STH 47 and CTH G intersection farther east along STH 47 to improve sight distance caused by horizontal and vertical curves along STH 47 to the west of the existing intersection. Safety will increase with the inclusion of a 90 degree intersection allowing motorist stopped on CTH G to see cross traffic on STH 47.	\$447,000
37	2016	Ponfil Road	Pulverize and Shape City. portion of road starting from Big Jim Zoar Road and ending at Askinette Road	\$349,424
38	2016	S. Branch Community Road and Street Repair Initiative	Upgrading and Repair existing S. Branch streets as funds allow and will include the following roads located in or around S. Branch Community	\$281,000

Table 12-1. Tribal Transportation Improvement Projects (2012-2017) - Continued

ID	Year	Project	Description	Total Estimated Cost
NA	2016	Direct Service Agreement Projects	Complete List of Direct Service projects TBD next year	\$73,000
39	2016	Survey & R-O-W Perfection Initiative	Survey, and Prefect R-O-W for various roads on the Menominee; Indian Reservation, and listed on the TTP Inventory	\$2,000
40	2016	Sidewalk/Parking Lot Initiative and Repair	Adding new or repair of sidewalks/parking lot in various location	\$119,600
41	2016	New Street Light Initiative and Repair	Addition of new street lighting to various locations and repairs	\$59,000
42	2016	TTP Transportation Planning	(5% TTP Construction Funds for TTP Transportation Planning)	\$63,500
43	2016	TTP Road Maintenance	(25% TTP Construction Funds for TTP Road Maintenance)	\$317,300
44	2016	TTP Transit	(5% TTP Construction Funds for TTP Transit)	\$63,500
45	2017	County Road B	Shape and re-gravel road starting from County A road and ending at the intersection of STH 55	\$338,000
46	2017	Southline Road	Shape and re-gravel road starting from Keshena Lake road and ending at the intersection of CTH HH and East Line Road	\$233,000
NA	2017	Direct Service Agreement Projects	Complete List of Direct Service projects TBD next year	\$83,000
47	2017	Survey & R-O-W Perfection Initiative	Survey, and Prefect R-O-W for various roads on the Menominee; Indian Reservation, and listed on the TTP Inventory	\$5,000
48	2017	Sidewalk/Parking Lot Initiative and Repair	Adding new or repair of sidewalks/parking lot in various location	\$169,600
49	2017	New Street Light Initiative and Repair	Addition of new street lighting to various locations and repairs	\$59,424
50	2017	TTP Transportation Planning	(5% TTP Construction Funds for TTP Transportation Planning)	\$63,500
51	2017	TTP Road Maintenance	(25% TTP Construction Funds for TTP Road Maintenance)	\$317,300
52	2017	TTP Transit	(5% TTP Construction Funds for TTP Transit)	\$63,500

Table 12-1. Tribal Transportation Improvement Projects (2012-2017) - Continued

ID	Year	Project	Description	Total Estimated Cost
35	2017	*STH 47 - Duquaine Rd to N JCT of CTH VV	Reconstruction/preservation - The project will include resurfacing from butt joint north of Duquaine Rd to N JCT of tribal Office Loop, urban reconstruction from N JCT of Tribal Office Loop through Fairgrounds Rd, and resurfacing from Fairgrounds Rd to the N JCT of CTH VV. Project to include on street accommodations for bicycles for entire length as agreed to by the tribe. The project to include pedestrian accommodation as agreed to by the tribe in the urban reconstruct portion. All signs and pavements.	\$815,000
		*Project is advanceable, if there is room in the 2016 budget there is a possibility that the project may be moved up and constructed in 2016.		

ENVIRONMENTAL FEATURES AND RESOURCES

For each of the environmental feature and resources there is a short narrative summarizing the data, limitations, an overview of the mitigation issues and system level mitigation measures. Buffers of one quarter mile are shown for improve/expand and new projects, while buffers of 250 feet are shown for bridge or point specific projects. It is assumed that potential impacts which must be mitigated for bridges or point specific projects are close to the site. Longer corridor construction projects are usually linear and would therefore have broader potential impacts to be mitigated and may impact one or more environmental feature or resource.

This report presents material at a high system level view. Maps and information in this chapter should be used with extreme caution and may not, except at the most generalized level, be valid for looking at specific project impacts and offsets without detail project engineering design and field reviews as part of the project level analysis and permit process.

The GIS features analysis should stand as is and represents a good faith effort to permit a system level view, but should not be used to identify specific impacts or offsets best left to the project level review and permit process. Still maps are illustrative and may be useful by road agency, resource and permit agencies in looking at overall systemic impacts which can further refine over time and in the local level review and permit process.

Geographic and Topographic Resources

The physical features, topography and drainage of the Menominee Reservation are primarily the result of glaciation.¹ Lakes, bogs and marshes define the landscape. Two major river systems, the Wolf and the Oconto Rivers drain the reservation. Many of the lakes within the reservation were formed from melting blocks of buried ice deposited by receding glaciers. Other lakes formed in depressions found in glacial till areas.

The western and southwestern parts of the Menominee Reservation are comprised of a number of parallel ridges appearing to be an extension of a drumlin field found in Langlade and Shawano counties. Outwash plains with gravel deposits are found in the northwestern and north central parts of the reservation, while sandy deposits are found in the southeastern portion. An area of moraines can be seen in the south central and eastern parts of the reservation. Finally, eskers, high in gravel, are found scattered around the reservation parallel to drainage ways.

The highest elevations are located in the northwest corner of the Menominee Reservation. Elevations decrease as the terrain moves towards the southeast. Within the Menominee Reservation, land relief is approximately 592 feet. It ranges from a high of 1,433 feet above sea level in the northwest corner of the Menominee Reservation to a low of 841 feet above sea level in the southeast corner.

¹ Soil Survey of Menominee County, Wisconsin, 2004.

Steep Slopes

Soil survey data (2004) taken from the US Department of Agriculture (USDA) and the Natural Resource Conservation Services (NRCS) from Langlade, Menominee and Shawano County's, were used to indicate areas that have slopes in excess of 12 percent. To develop the soil survey, scientists made comparisons among the profiles² to determine the soil series. Boundaries of soil series were drawn on aerial photographs. The resulting map is detailed enough to be useful for planning purposes. However, since it is not practical to show each small scattered bit of soil, the map reflects what the dominant or recognized soil phases are.

Exhibit 12-1 indicate areas that have slopes in excess of 12 percent. Steep slopes within the MITW Reservation are found throughout the reservation. These areas provide a natural habitat for wildlife, as well as offer recreational opportunities for hiking and wildlife observation. Approximately 12.6 percent (29,538 acres) of the MITW Reservation is classified as having slopes in excess of 12 percent.

Mitigation Issues and System Level Mitigation Measures

Slopes in excess of 12 percent are subject to erosion. Disturbing these areas should be minimized and special care should be taken to re-establish these slopes and minimize erosion. Areas disturbed by construction activities should be stabilized and vegetated as soon as final grading has been completed. Temporary erosion control measures should be implemented and maintained during construction until permanent soil erosion and sedimentation controls are in place. **Table 12-2** show the projects within proximity of steep slopes (>12%).

Table 12-2. Transportation Projects within Proximity of Steep Slopes (>12%)	
1	26
2	34
4	35
5	36
9	37
17	45
18	46

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Geologic Features and Farmland Resources

Mining Sites

There is a number of non-metallic mining site locations, but none are active at this time. Mining site locations can be found at **Exhibit 12-1**.

- Non-metallic mineral resources include all mined minerals other than those mined as a source of metal. Economically important non-metallic minerals include building stone,

² A profile is the sequence of natural layers or horizons, in a soil, it extends from the surface down into the parent material that has not been changed much by leaching or the by actions of plant roots.

lime, sand, gravel, and crushed stone. There are no active non-metallic mineral resource sites on the Menominee Reservation.

- Metallic mineral resources refers to mining of mineral deposits that contain recoverable quantities of metals such as copper, zinc, lead, iron, gold, silver, and others. There are no metallic mineral resource sites on the Menominee Reservation.

Bedrock

Bedrock geology for the MITW is made up of primarily dolomite, shale and some small pockets of sandstone.³ At one time, glaciers covered what is now the MITW Reservation, modifying the land surface by carving and gouging out soft bedrock, smoothing off hilltops, filling valleys and leaving a deposit of debris over the land. High bedrock areas refer to bedrock that is less than 60 inches from the surface. Areas of high bedrock (5 acres or more) within the MITW Reservation are shown on **Exhibit 12-1**. Approximately 1.4 percent (3,307 acres) has areas of high bedrock that are five acres or more in size within the MITW Reservation.

Mitigation Issues and System Level Mitigation Measures

While high bedrock can result in higher construction costs, it also may be used as building materials for road construction. **Table 12-3**. indicates projects within proximity of high bedrock (5 Acres or more) areas.

Table 12-3. Transportation Projects within proximity of High Bedrock (5 Acres or more)	
1	10
9	45

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Agricultural Resources

Agricultural resources play a very limited and minor role within the Menominee Reservation. Most properties currently in agriculture, according to the current land use map, are found in the South Branch area. Agricultural uses are considered "garden type" and do not contain livestock or cropland operations. Even though agriculture has a minor role in the reservation, this section of the plan will look at important farmland classifications.

Farmland

Land capability classification is a system of grouping soils primarily on the basis of their capability to produce common cultivated crops and pasture plants. This classification was developed by the U.S. Department of Agriculture⁴ and is further described below.

- **Class I soils have few limitations or hazards that restrict their use.** Soils in this classification are suited for a wide range of plants and may be safely used for cultivated

³ Bedrock Geology of Wisconsin, UW-Extension Geological and Natural History Survey, April 1981, revised 1995.

⁴ <http://soils.usda.gov/technical/handbook/contents/part622.html>.

crops, pasture, range, woodland, and wildlife. These soils are nearly level and erosion hazard by wind or water is low.

- **Class II soils have some limitations that reduce the choice of plants or require moderate conservation practices.** Careful soil management must be used when these soils are cultivated. Though, in general, limitations are few and the practices are easy to apply. Soils in this classification may be used for cultivated crops, pasture, range, woodland, or wildlife food and cover.
- **Class III soils have severe limitations that reduce the choice of plants or require special practices, or both.** Soils in this classification have more restrictions than those in class II and when used for cultivated crops, the conservation practices are usually more difficult to apply and to maintain. They may be used for cultivated crops, pasture, woodland, range or wildlife food and cover. Limitations in this soil class restrict the amount of clean cultivation; timing of planting, tillage, and harvesting; and choice of crops.
- **Class IV soils have very severe limitations that restrict the choice of plants, require careful management, or both.** Restricts in use for this classification is higher than those in Class III and the choice of plants is more restricted. When these soils are cultivated, more careful management is required and conservation practices are more difficult to apply and maintain. Soils may be used for crops, pasture, woodland, range or wildlife food and cover.
- **Class V soils have little or no erosion hazard but have other limitations impractical to remove that limit their use largely to pasture, range, woodland, or wildlife food and cover.** These soils have limitations that restrict the kind of plants that can be grown and that prevent normal tillage of cultivated crops. They are nearly level but some are wet, are frequently overflowed by streams, and are stony.
- **Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.** Soils in this classification have continuing limitations that cannot be corrected.
- **Class VII soils have very severe limitations that make them unsuitable to cultivation and that restrict their use largely to grazing, woodland, or wildlife.** Soil restrictions are more severe than those in class VI.
- **Class VIII soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water support or esthetic purposes.** Badlands, rock outcrop, sandy beaches, river wash, mine tailings, or other nearly barren lands are included in this class.

According to the above criteria, the highest percentage of land within the reservation consists of Class IV through VIII soils. Scattered throughout the Menominee Reservation, 55.1 percent (129,679 acres) of the land is found within these soil classifications. Class I and II soils, are considered "prime farmland" and account for about 22.0 percent (51,541 acres) of land within

the Menominee Reservation. Although, these farmlands are scattered throughout the reservation, they are less predominant in the center of the reservation. Approximately 21 percent (48,792 acres) of land consists of Class III soils (**Exhibit 12-1**). The remaining 5,273 acres of land are water or are not rated.

Mitigation Issues and System Level Mitigation Measures

Transportation projects should consider farmland preservation and impacts during planning, design, construction and maintenance of transportation projects within these areas. Access to farmland areas is critical for farmers to plant, harvest and maintain their crops and properly care for their animals. Dust, noise and other aspects of construction may interfere with farming activities. Transportation projects may fragment parcels of land, making it harder to permanently access fields or maintain viability. Mitigation measures include maintaining access, limiting land acquisitions, etc.

The majority of transportation projects either cross, are in proximity to, or go through prime farmland, thus a visual inspection of each site for agricultural activity should be considered in relation to projects. **Table 12-4** shows transportation projects within proximity of prime farmlands.

Table 12-4. Transportation Projects within Proximity To Prime Farmlands (Class 1 & 2)	
1	25
2	26
9	33
10	35
13	36
17	37
18	45
20	

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Water Resources

Water resources are sources of water that are useful or potentially useful to humans, wildlife and aquatic life including fish. Water is needed for life to exist and is used for household, agricultural, recreational, industrial and environmental activities. There are numerous pressures facing water resources, such as invasive species, beach closures due to pollution, sewer overflows, wetland loss, stormwater runoff, drought, floods, increasing water demands by residential, agricultural, recreation and industrial activities, climate change, and potential ground and surface water contamination due to pesticides, chemicals, and natural occurring minerals.

Watershed, lakes, ponds, river, stream data was obtained from the WDNR and MITW. Wetland data was provided by the WDNR in 2004, while floodplain data was compiled through studies conducted by the Army Corp of Engineers. Wetland mitigation areas were obtained from WisDOT.

Groundwater

Groundwater is stored in porous strata called aquifers. An aquifer is a rock or soil layer capable of storing, transmitting and producing potable water for human consumption. It is available at various depths, depending upon the general topography, the distance above the permanent stream level, and the character of the underlying rock formation. The main aquifer in the County/Reservation is glacial drift, particularly glacial outwash and ice-contact sand and gravel. Generally, the fractured crystalline bedrock does not supply much water, although locally it provides a small amount for domestic uses. The bedrock or the thin deposits of glacial drift overlying the bedrock in the southwestern part of the County/Reservation, west of Neopit and continuing through the central part and northeast to the Wolf River, generally yield only a few gallons of water per minute. Wells in Neopit are in glacial outwash and yield 125 to 325 gallons per minute.⁵

The Menominee Indian Tribe of Wisconsin (Tribal Utilities Department) provides municipal water to tribal and non-tribal properties in the unincorporated communities of Keshena, Neopit, Middle Village, Red Wing (Legend Lake area), Zoar and the Trailer Court (Legend Lake area). The remaining properties within the Menominee Reservation are served by private wells.

Groundwater Contamination Susceptibility

The Groundwater Contamination Susceptibility Model (GCSM) was developed by the DNR, the US Geological Survey (USGS), the Wisconsin Geological & Natural History Survey (WGNHS), and the University of Wisconsin – Madison in the mid-1980s.

The ease that pollutants can be transported from the land surface to the groundwater or “water table” defines a groundwater’s susceptibility to pollutants. Materials that lie above groundwater offer protection from contaminants. However, the amount of protection offered by the overlying materials varies, depending on the materials. In order to identify areas sensitive to contamination, the DNR, the US Geological Survey (USGS), the Wisconsin Geological & Natural History Survey (WGNHS), and the University of Wisconsin – Madison in the mid-1980s developed the Groundwater Contamination Susceptibility Model or GCSM. Five resource characteristics were identified: depth to bedrock; type of bedrock; soil characteristics; depth to water table; and characteristics of surficial deposits. Each of the five resource characteristics was mapped, and a composite map was created. A numeric rating scale was developed and map scores were added together. An index method was used to determine susceptibility; however this method of analysis is subjective and includes little quantifiable or statistical information on uncertainty. This limits the use of the information for defensible decision making. Therefore, while groundwater contamination susceptibility maps can be useful, this level of uncertainty must be kept in mind. The results of the GCSM are identified in **Exhibit 12-1**.

According to the groundwater contamination susceptibility map, about half the MITW Reservation is susceptible to contamination (**Exhibit 12-1**).

⁵ Soil Survey of Menominee County, Wisconsin http://soildatamart.nrcs.usda.gov/Manuscripts/WI078/0/Menominee_WI.pdf

Mitigation Issues and System Level Mitigation Measures

Potential groundwater impacts should be considered during planning, design, construction and maintenance of transportation projects within areas of higher susceptibility to groundwater contamination. Transportation projects can impact groundwater when materials such as paint, solvent, fuel, etc. enter areas that provide direct links to the groundwater system.

Projects within areas of higher potential for groundwater contamination should integrate stormwater management into the design of the site. Stormwater management systems should be designed to protect area groundwater supplies, such as draining away from these areas. Parking or storing equipment in areas of potential groundwater contamination should be prohibited. All hazardous materials should be properly handled, stored and disposed of properly. If possible construction should utilize less hazardous materials when possible. Equipment should be kept in good working order and leak free. Avoid hosing down equipment on site.

New or wider roadways increase the amount of impervious surface that is available. Therefore groundwater mitigation measures should include permanent stormwater management systems. Stormwater runoff can contain chemicals from leaking vehicles, road salt and other pollutants that can enter the groundwater system.

According to the groundwater contamination susceptibility map, the following transportation projects are in areas more susceptible to groundwater contamination (**Table 12-5, Exhibit 12-1**).

Table 12-5. Transportation Projects within Proximity To Areas More Susceptible to Groundwater Contamination	
1	26
2	34
4	36
5	37
9	45
17	46
18	

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Groundwater Quality

The groundwater in the reservation generally is of good quality. The main components in the water are calcium, magnesium, and iron. In some areas, particularly within moraines, the groundwater is hard. A large concentration of iron is in the groundwater throughout the reservation, but the iron is not considered to be a health hazard.⁶

Wellhead Protection Areas

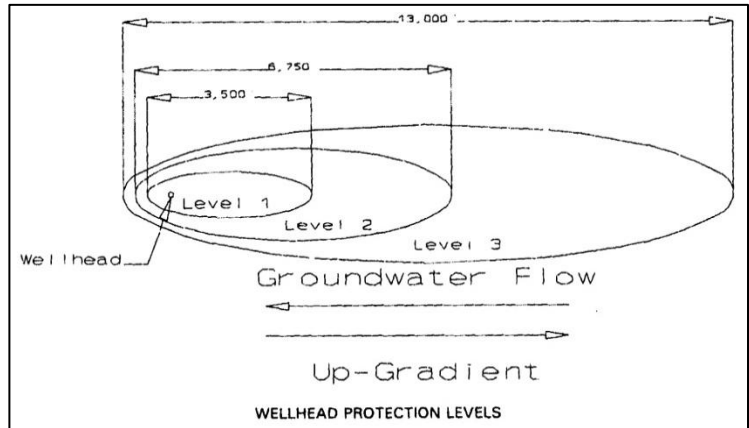
The MITW has a wellhead protection ordinance (Article XXII, § 625-185 — § 625-191) to

⁶ Soil Survey of Menominee County, Wisconsin http://soildatamart.nrcs.usda.gov/Manuscripts/WI078/0/Menominee_WI.pdf

institute land use regulations and restrictions to protect the reservation's municipal water supply and well fields and to protect the public health, safety, and general welfare of the residents of the Menominee Indian Reservation. The standards set out in this article shall apply in the district.⁷

Wellhead Protection Levels

- Protection Level 1 shall incorporate (either or):
 - An elliptical area with one focal point located on the wellhead and the second focal point located 2,500 feet from the wellhead and upgradient of the groundwater flow. The sum of the distances from the focal points to any point on the ellipse edge shall equal 3,500 feet; or
 - As adequate time of travel information becomes available and a five-year is delineated for a municipal water system wellhead, maps of which shall be kept on file in the Department.
- Protection Level 2 shall incorporate (either or):
 - An elliptical area with one focal point located on the wellhead and the second focal point located 5,250 feet from the wellhead and upgradient of the groundwater flow. The sum of the distances from the focal points to any point on the ellipse edge shall equal 6,750 feet; or
 - As adequate time of travel information becomes available and a ten-year is delineated for a municipal water system wellhead, maps of which shall be kept on file in the Department.
- Protection Level 3 shall incorporate the area as defined in § 625-186.



Picture was taken directly from MITW Article XXII, § 625-185 — § 625-191

Mitigation Issues and System Level Mitigation Measures

Wells provide direct links to the groundwater system. Additionally pollutants on the land can seep into the ground and move towards municipal wells. Potential impacts to wellhead protection areas should be considered during planning, design, construction and maintenance of transportation projects. If a wellhead protection area is impacted, specific measures to protect the wellhead will depend on the depth to bedrock; type of bedrock; soil characteristics; depth to water table; and characteristics of surficial deposits. At a minimum, care should be taken to direct stormwater runoff away from these areas.

According to **Exhibit 12-3**, the following transportation projects are in wellhead protection areas (**Table 12-6**).

⁷ Article XXII, § 625-185 — § 625-191

**Table 12-6. Transportation Projects
within Proximity To Wellhead Protection Areas**

18

37

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Basins, Watersheds, Lakes, Rivers, and Streams

The state is divided into 24 water basins; the MITW is contained entirely within two water basins, the Wolf River Basin and the Upper Green Bay Basin. Each river basin is further broken down into water sheds. The Wolf River Water Basin contains four watersheds and the Upper Green Bay Water Basin contains three. Watersheds encompass lakes, ponds, rivers and streams. The following is a description of the water basins and watersheds contained within the MITW Reservation. Water basins and watersheds can be found on **Exhibit 12-2**.

Wolf River Water Basin

The Wolf River Basin drains about 3,690 square miles and is divided into 20 sub-watersheds. It includes all of Waupaca County and parts of Forest, Langlade, Marathon, Menominee, Oneida, Outagamie, Portage, Shawano, Waupaca, Waushara and Winnebago Counties. Almost the entire 233,384-acre Menominee Indian Reservation is within the basin.⁸ The Wolf River Basin contains four watersheds that fall within MITW Reservation: the Red River, Shawano Lake, West Branch Wolf River and Wolf River – Langlade and Evergreen River.

Red River Watershed

The 208-square-mile Red River watershed is in southcentral Langlade County, northcentral Shawano County, and southwest Menominee County/Reservation. The West Branch and Red River are approximately 74 miles in length and flow through the Menominee and Stockbridge Reservations. Nearly all streams in this watershed are classified as trout waters.⁹ **Table 12-7** list the lakes, rivers, streams and creeks within the Menominee Reservation.

Table 12-7. Red River Watershed within MITW Reservation

NAME	NAME
Burney Lake	First North Branch Mill Creek
Hemlock Lake	Gardner Creek
Red Springs	Miller Creek
Red River	Second North Branch Mill Creek
West Branch Red River	Third North Branch Mill Creek
Camp 2 Creek	Tousey Creek

Source: MITW Article III. WATERS OF THE RESERVATION, § 512-8. List of water bodies.

Shawano Lake Watershed

The Shawano Lake Watershed covers 62 square miles in Shawano and Menominee counties. A majority of the planning area is contained within this watershed; the 6,178-acre Shawano Lake is the main water resource. Shawano Lake is a hardwater drainage lake up to 40 feet deep and is an important year-round recreational waterbody. This lake experiences excessive weed growth during July and August, which is likely associated with non-point source pollution (i.e.,

⁸ WDNR 7/27/12 <http://dnr.wi.gov/water/basin/wolf/index.htm>

⁹ <http://dnr.wi.gov/water/watersheds/>

phosphorus from lawn fertilizers, etc.). Other small lakes included in this watershed are Loon Lake, Washington Lake, Lulu Lake, White Clay Lake and Lily Lake. Rivers and streams associated with this subwatershed include the Shawano Lake Outlet, Duchess Creek, Loon Creek, and Murray Creek.¹⁰ **Table 12-8.** list the lakes, rivers, streams and creeks within the Menominee Reservation.

Table 12-8. Shawano Lake Watershed within MITW Reservation	
NAME	NAME
Bass Lake (Southeast)	Loon Creek
Coon Lake	Pine Creek
Pine Lake	Rice Creek
Rice Lake	

Source: MITW Article III. WATERS OF THE RESERVATION, § 512-8. List of water bodies.

West Branch Wolf River Watershed

The West Branch Wolf River Watershed includes the portion of the Wolf River from the Shawano Dam in the City of Shawano to near the mouth of the Evergreen River in Menominee County/Reservation. This watershed includes much of the Menominee Reservation. An increasing amount of cleared land for dairy and other agriculture is evident in the Langlade County portion, while the Menominee Reservation remains predominantly wooded or wild. Nearly all streams in this watershed are classified as trout waters. U.S. Geological Survey (USGS) has written a report on the water quality of the Menominee Indian Reservation of Wisconsin.¹¹ **Table 12-9.** list the lakes, rivers, streams and creeks within the Menominee Reservation.

Table 12-9. West Branch Wolf River Watershed within MITW Reservation	
NAME	NAME
Bass Lakes (Lower)	Big Eddy Creek
Bass Lakes (Upper)	Bow Hunter Creek
Beauprey Lake	Camp 15 Creek
Brigham Lake	Camp 7 Creek
Cott Lake	Chickney Creek
Crowell Lake	Crow Rapids Creek
Florence Lake	Dalles Creek
Frechette's Lake	Ducknest Creek
Hazel Lake	Elma Creek
Keshena Lake	Fish Creek
Kemmet Springs Lake	Five Islands Creek
Lamotte Lake	Florence Creek
Lake Elma	Kinepoway Creek
Lake Neconish	Little West Branch Creek
Lake Noseum	Menominee Creek
Little Sand Lake	Minnow Creek
Perote Lake	North Branch Allender Creek
Round Lake	North Branch Menominee Creek
Sand Lake	North Branch Oshkosh Creek

¹⁰ <http://dnr.wi.gov/water/watersheds/>

¹¹ <http://dnr.wi.gov/water/watersheds/>

Teabeau Lake	Noseum Creek
Waukau Lake	Oshkosh Creek
Neopit Mill Pond	Peavy Creek
Walleye Pond	Pendleton Creek
Askennette Springs	Rapids Creek
North Springs	Soman Creek
Little West Branch Wolf River	Squaw Creek
West Branch Wolf River	Tourtillott Creek
Wolf River	Wayka Creek
Allender Creek	West Branch Chickney Creek

Source: MITW Article III. WATERS OF THE RESERVATION, § 512-8. List of water bodies.

Wolf River – Langlade and Evergreen River Watershed

The Wolf River/Langlade and Evergreen River Watershed is in north central Menominee and eastern Langlade Counties covering 147 square miles. The watershed includes the Wolf River from the mouth of the Evergreen River in Menominee County/Reservation, north to below the mouth of the Lily River in Langlade County. The entire stretch of the Wolf River above the Menominee County/Reservation line is included in Chapter NR 102, Wisconsin Administrative Code, as an Outstanding Resource Water. This watershed has generally good water quality. The problems associated with this watershed are due to recreational use and the natural impacts of beaver activity. The mainstream Wolf River flows for 33 miles through this watershed. The MITW designated a ¼ mile buffer around the Wolf River and any activity within the buffer needs to consult the tribe. **Exhibit 12-2** depicts the Wolf River and ¼ mile buffer.

The Evergreen River extends for 20 miles through Langlade and Menominee counties. The river is a Class I trout stream. In Langlade County, the watershed is about 60 percent wooded or wild; on the Menominee Reservation, nearly 100 percent is wooded or wild. As with most streams in this watershed, the Evergreen River is affected by intense beaver activity. **Table 12-10** lists the lakes, rivers, streams and creeks within the Menominee Reservation.

Table 12-10. Wolf River – Langlade and Evergreen River Watershed within MITW Reservation	
NAME	NAME
Herman's Lake	Burnt Shanty Creek
LaVerne Lake	Camp 12 Creek
Lower McCall Lake	Deadman Creek
McCall Lake	Elton Creek
Deadman Spring Lake	Lazy Creek
Evergreen River	McCall Creek
Wolf River	Tall Timber Creek

Source: MITW Article III. WATERS OF THE RESERVATION, § 512-8. List of water bodies.

Upper Green Bay Water Basin

The Upper Green Bay Basin consists of 18 watersheds in northeastern Wisconsin, including all of Florence, Marinette and Oconto counties and a major portion of Forest County, and smaller

regions of Brown, Langlade, Menominee, Outagamie, Shawano, and Vilas counties.¹² The Upper Green Bay Water Basin contains three watersheds that fall within MITW Reservation: the Lower North Branch Oconto River, Lower Oconto River and South Branch Oconto River.

Lower North Branch Oconto River Watershed

The Lower North Branch Oconto River Watershed lies in central Oconto County. Small portions of the watershed extend into west central Marinette County, southern Forest County, northeastern Langlade County and northeastern Menominee County/Reservation.¹³ **Table 12-11.** list the lakes, rivers, streams and creeks within the Menominee Reservation.

Table 12-11. Lower North Branch Oconto River Watershed within MITW Reservation	
NAME	NAME
Weso Lake	Weso Creek
North Branch Weso Creek	

Source: MITW Article III. WATERS OF THE RESERVATION, § 512-8. List of water bodies.

Lower Oconto River Watershed

The Lower Oconto River watershed lies in central Oconto County with small portions of the watershed extending into northern Shawano County and eastern Menominee County/Reservation.¹⁴ **Table 12-12.** list the lakes, rivers, streams and creeks within the Menominee Reservation.

Table 12-12. Lower Oconto River Watershed within MITW Reservation	
NAME	NAME
Berry Lake	Sapokesick Lake
Big Blacksmith Lake	Skice Lake
Little Blacksmith Lake	Spring Lake
Long Lake	Stone Lake
Little Rice Lake	Stoney Lake
Moshawquitt Lake	Wah-Toh-Sah Lake
Perch Lake	Rainbow Pond
Pestigo Lake	Jackson Creek
Pywaosit Lake	Linzy Creek
Rushes Lake	

Source: MITW Article III. WATERS OF THE RESERVATION, § 512-8. List of water bodies.

South Branch Oconto River Watershed

The South Branch Oconto River Watershed is situated in west-central Oconto, eastern Langlade and eastern Menominee County/Reservation. The watershed is approximately 140,332 acres in size and consists of 217 miles of streams and rivers, 2,812 acres of lakes and 20,278 acres of wetlands. The watershed is dominated by forests (71 percent) and is ranked low for nonpoint source issues affecting streams and groundwater.¹⁵ **Table 12-13.** list the lakes, rivers, streams and creeks within the Menominee Reservation.

¹² WDNR 7/27/12 <http://dnr.wi.gov/water/basin/upgb/index.htm>

¹³ <http://dnr.wi.gov/water/watersheds/>

¹⁴ <http://dnr.wi.gov/water/watersheds/>

¹⁵ <http://dnr.wi.gov/water/watersheds/>

Table 12-13. South Branch Oconto River Watershed within MITW Reservation	
NAME	NAME
Big Injun Lake	Saint Joseph Lake
Crystal Springs Lake	Sunia Lake
Founder Lake	Turtle Lake
Fredenberg Lake	Vejo Lake
Grignon Lake	Beauprey Springs
Half Moon Lake	First South Branch Oconto River
Labelle Lake	South Branch Oconto River
Marsh Lake	Founder Creek
Pine Lake	Pecore Creek

Source: MITW Article III. WATERS OF THE RESERVATION, § 512-8. List of water bodies.

Mitigation Issues and System Level Mitigation Measures

Water resources are considered impacted if (1) polluted stormwater runoff reaches lakes, ponds, rivers and streams; (2) area vegetation is removed; (3) there is damage to stream beds or banks caused by heavy equipment; or (4) accidental spills such as paint, salt, solvent, etc. that run directly into bodies of water. Therefore, surface water impacts should be considered during planning, design, construction and maintenance of transportation projects.

If it is determined that a water resource could be impacted by the project, if possible, steps should be taken to avoid impacts to these resources. If however, impacts are unavoidable, then a course of action should be established to minimize these impacts. Stormwater management should be incorporated into the site design, low impact development practices should be utilized that help infiltrate stormwater into the ground, instead of diverting stormwater directly to the water resource. Special requirements should be incorporated that address water resource sensitivity into the plans and specifications. Erosion control practices should be implemented to capture sediments and control runoff before site disturbance occurs. Project level reviews should include, but are not limited to proper permits, soil erosion protections, control and limitation of pollutants, vegetation buffers and sedimentation control measures.

Table 12-14. Transportation Projects within Proximity of Basins, Watersheds, Lakes, Rivers, and Streams	
1	35
2	36
4	37
9	45
10	46
26	

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Basins, Watersheds, Lakes, Rivers, and Streams within the MITW Reservation are located in **Exhibit 12-2**.

Wetlands

Wetlands act as a natural filtering system for nutrients such as phosphorous and nitrates. They serve as a natural buffer protecting shorelines and stream banks from erosion. Wetlands are essential in providing wildlife habitat, flood control, and groundwater recharge. Consequently, local, state, and federal regulations place limitations on the development and use of wetlands and shorelands. The Shoreland Overlay District for the Menominee Reservation has been incorporated into the Menominee Tribal Zoning Code, Chapter 625, Article 163. This code adopted by MITW regulates development within 1,000 feet of the ordinary high water elevation mark of navigable lakes or ponds or 500 feet from the ordinary high water elevation mark of navigable rivers or streams or the landward side of the floodplain, whichever distance is greater. Wetlands that are five acres or more and are designated as wetlands on the Wetlands Inventory Maps stamped "Final" on December 17, 1985, for Menominee County and labeled "Revised" on December 6, 1984 for Shawano County are regulated under this code.

The Menominee Indian Tribe of Wisconsin, Environmental Services Department has authority over the placement of fill materials in virtually all wetlands¹⁶. The United States Army Corps of Engineers and the United States Department of Agriculture also have jurisdiction over wetlands within the Menominee Reservation. Prior to placing fill or altering wetland resources, the Tribe and/or appropriate agencies must be contacted to receive authorization.

The wetlands surveyed according to the Wisconsin Wetlands Inventory Map are shown on **Exhibit 12-2**. They were identified on aerial photographs by interpreting vegetation, visible hydrology, and geography based on the U.S. Fish and Wildlife Service. Wetlands within the MITW are somewhat scattered, but a larger wetland association is found north of Legend Lake. Wetland vegetation can be classified as Forested Broad Leaved Deciduous, Forested Emergent Wet Meadow, Emergent Wet Meadow, Shrub/Shrub Broad Leaved Deciduous. Not including small tracts of wetlands (less than five acres); only about 6.1 percent (14,277 acres) of the MITW Reservation is classified as wetlands.

Mitigation Issues and System Level Mitigation Measures

If at all possible avoid locations in proximity to wetlands. If project location is unavoidable, a wetland mitigation plan should be developed that identifies measures proposed to minimize adverse impact and replace lost wetland habitat values and other wetland functions and values. A mitigation plan should include design features such as culverts to retain hydrological connection between areas fragmented by the project, soil erosion protections, control and limitation of pollutants, vegetation buffers and sedimentation control measures. Mitigation measures should be centered around sound construction management practices and permitting. Projects that are in the vicinity of wetlands within the MITW Reservation are included in **Table 12-15**.

¹⁶ Chapter 512 Surface Waters, Tribal Government of Menominee Indian Tribe of Wisconsin, Wisconsin Code of Ordinances.

Table 12-15. Transportation Projects within Proximity of Wetlands	
1	33
2	35
9	36
10	37
17	45
18	46
26	

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Floodplains

Areas susceptible to flooding are considered unsuitable for development due to potential health risks and property damage. The most recent and available floodplain mapping within the Menominee Reservation was completed in 1999 by the US Army Corps of Engineers. The floodplain reports titled "Phase III West Branch of Wolf River Flood Plain Delineation Study" and "South Branch of Oconto River Floodplain Delineation Study" highlights the 100 and 500 year floodplains surrounding the Keshena and South Branch area (**Exhibit 12-2**).¹⁷

Mitigation Issues and System Level Mitigation Measures

There is a special need for sound construction engineering and management practices when constructing public facilities in flood prone areas. There are a number of transportation projects in proximity to the 100 and 500 year floodplains (**Table 12-16**), therefore project staging and safety/security issues should be coordinated to avoid potential emergency response problems during construction. Maps contained in this report should help facilitate examination of these system level issues by transportation and land use decision makers to potentially mitigate impacts of floods on public property and on public safety.

Table 12-16. Transportation Projects within Proximity of Floodplains	
1	35
4	

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Hazardous and Contaminated Sites

The MITW has identified seven abandon landfills within the reservation. All abandoned landfills are identified in **Exhibit 13-3**.

The WDNR Bureau of Waste Management Program operates the Solid and Hazardous Waste Information System (SHWIMS) provides access to information on sites, and facilities operating

¹⁷ US Army Corps of Engineers, Phase III. 1999. *West Branch of Wolf River Flood Plain Delineation Study and South Branch of Oconto River Floodplain Delineation Study*

at sites, that are regulated by the Wisconsin DNR Waste Management program. Activities that occur at facilities include landfill operation, waste transportation, hazardous waste generation, wood burning, waste processing, sharps collection and many more. A search of the data base for solid waste landfills/disposal facilities indicates that there are 6 disposal facilities within the MITW Reservation. See **Appendix E-1** for a complete list of disposal facilities.

The WDNR Remediation and Redevelopment (RR) Program oversees the investigation and cleanup of environmental contamination and the redevelopment of contaminated properties. The Bureau of Remediation and Redevelopment Tracking System (BRRTS) is available on the internet. This on-line database provides information about contaminated properties and other activities related to the investigation and cleanup of contaminated soil or groundwater in Wisconsin. According the website, there are 13 Environmental Repair (ERP) sites and Leaking Underground Storage Tank (LUST) Sites in MITW Reservation (See **Appendix E-2** for complete list). Of those 13 sites only one is active. The abandoned landfills, disposal facilities and LUST sites are shown in **Exhibit 12-3**.

Mitigation Issues and System Level Mitigation Measures

Hazardous materials contamination is more of an issue in project construction design and best management practices, as developed through the project review and construction permit process. Consideration of these sites at the stage of system planning may enhance opportunities to coordinate site closure, cleanup, construction and remediation economies of scale and permit earlier more cost effective environmental mitigation measures. Mitigation practices for hazardous/contaminated materials or sites include a project area contamination survey to determine if any known or potential sites of environmental contamination exist that could affect the project's design, cost or schedule. Common hazardous/contaminated sites identified include LUST sites from former or existing gas stations, former landfills, adjacent industrial or commercial operations and asbestos lined utility pipes or structure components. Special attention may be warranted when transportation projects and LUST site clusters also correspond to wellhead, flood prone or other areas where mitigation may be even more important to protect public health.

Table 12-17. Transportation Projects within Proximity of Solid Waste Landfills, Disposal Facilities and LUST sites	
1	18
2	20
4	35
10	

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Wildlife Resources

The Menominee have long been recognized for the management of the forest under sustained yield principals, with 95 percent of the reservation maintained in forest habitat. The fish and wildlife populations have remained fairly healthy and diverse since the creation of the Menominee Reservation.

Woodlands or Sustained Yield Forestland

Originally, the majority of the Menominee Reservation contained extensive stands of oak/jack pine barrens, jack pine forests, hardwood forests (sugar maple, hemlock and yellow birch) along with red pine and white pine stands. Today forestland is the dominant land use in the Menominee Reservation and approximately 94 percent of the total land area on the Menominee Reservation is forested, the majority of these wooded areas are unplanted (**Exhibit 12-4**). The Menominee Reservation forests presently consist of northern hardwoods, aspen with smaller amounts of oak, lowland hardwoods, jack pine and oak barrens.

The Menominee Nation, through the Menominee Tribal Enterprises (MTE) maintains sustainable forestry management traditions that are recognized nationally. Land, managed by MTE, is held by the United States in trust for the Menominee Nation. The remainder of the forested land in the County/Reservation is considered fee lands and Tribal lease lots. Pine and Northern oak type forests comprise the majority of these lands. According to the MITW, in 2009, a total of about 205,997 acres were managed by MTE (Sustained yield forestland) within the Menominee Reservation (**Exhibit 12-3**).¹⁸

Mitigation Issues and System Level Mitigation Measures

Almost all the projects within the MITW either cross, are in proximity to, or go through woodlands or sustained yield, thus prior to construction a thorough site analysis is necessary to ensure woodlands or sustained yield is not adversely affected. Project managers should work closely with the MITW throughout the planning and construction of transportation projects.

Table 12-18. Transportation Projects within Proximity of Woodlands or Sustained Yield Forestland	
1	33
2	35
4	36
9	37
10	45
18	46
26	

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Rare, Threatened and Endangered Species and Natural Communities

The Endangered Species Act (ESA) of 1973 recognized that our rich natural heritage is of "esthetic, ecological, educational, recreational, and scientific value to our Nation and its people". It further expressed concern that many of our nation's native plants and animals were in danger of becoming extinct. Administered by the U.S. Fish and Wildlife Service (FWS) and the Commerce Departments' Natural Marine Fisheries Service (NMFS), the purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. The FWS has primary responsibility for terrestrial and freshwater organisms, while the NMFS is mainly responsible for marine wildlife. Under the ESA, species are either listed as endangered or

¹⁸ Menominee Indian Tribe of Wisconsin, July 6, 2009.

threatened. Endangered means a species is in danger of extinction throughout all or a significant portion of its range. Whereas threatened means a species is likely to become endangered with the foreseeable future. According to the U.S. Fish and Wildlife database, there are two endangered species in Menominee County/Reservation (Karner blue butterfly and Gray wolf), three endangered species (Snuffbox mussel, Karner blue butterfly and Gray wolf) and one experimental population (Whooping crane) in Shawano County, and one endangered species (Gray wolf) in Langlade County. A listing of federal endangered species is found in **Appendix E-3**.

Mitigation Issues and System Level Mitigation Measures

If any rare, threatened and endangered species are identified in the area of construction then further investigation is needed. Field surveys may be necessary to identify rare, endangered and threatened species and/or habitat that may be impacted during construction and continued maintenance of the project. Depending on the species identified; seasonal and other limitations may be imposed on the project.

Exotic and Invasive Species

Non-native species commonly referred to as exotic or invasive species have been recognized in recent years as a major threat to the integrity of native ecosystems, habitats, and the species that utilize those habitats. Invasive species disrupt native ecosystems by out-competing native plants and animals for valuable resources such as food and space. The resulting competition between native and invasive species has the potential to completely displace native species. Invasive species are found in both aquatic and terrestrial habitats. The WDNR updates a list of plant and animal invasive species in Wisconsin. This list can be found on the Department's website at: <http://dnr.wi.gov/topic/Invasives/>. Human livelihood and quality of life are greatly altered by invasive species; they hamper boating, swimming, fishing, and other water recreation; place an economic burden on local communities in eradication and control costs; and in some instances present a potential fire hazard.

Mitigation Issues and System Level Mitigation Measures

If any exotic and/or invasive species are identified at the site then further investigation is needed. Field surveys may be necessary to identify the species and extent of the exotic and/or invasive species and/or the habitat that is being impacted.

Parks, Open Space, and Recreational Resources

Public open space such as parks and parkways are important to the quality of life within a community. These lands serve many purposes including outdoor recreation and education; buffers between different land uses; flood and stormwater management; habitat preservation; air and surface water quality improvements; protection of groundwater recharge areas; and aesthetics.

Mitigation Issues and System Level Mitigation Measures

Potential impacts on parks, open space and recreational areas should be considered during the planning, design, construction and maintenance of transportation projects. Parks, open space and recreational areas are considered impacted if land is acquired for a project, if land is otherwise occupied (such as a retention basin) in a manner that is adverse to the recreational

purpose of the land or if a project in the proximity of the resource substantially impacts its purpose.

Section 4(f) of the United States Department of Transportation Act of 1966 (subsequently codified into 49 United States Code Section 303) stipulates that federally funded transportation projects cannot use publicly-owned public parks or recreation areas unless there is no feasible and prudent alternative to the use of the land, and that the action includes all possible planning to minimize harm resulting from the use.

Planning should include an inventory of existing and future identified park, open space and recreation areas to determine if the resource could be impacted by the transportation project. If possible avoid impacts to park, open space and recreational areas. Where impacts are unavoidable, mitigate them as much as possible. Some mitigation techniques to consider include (1) acquiring the impacted property and compensating for the loss either monetarily or by acquiring replacement land; (2) acquire scenic easements and construct appropriate visual screening consistent with the context of the recreational use; (3) Restore, relocate or rehabilitate impacted features and context (natural areas and facilities); (4) Preserve as much of the resource and site features as possible; and (5) avoid and mitigate new visual, atmospheric, and/or audible elements that detract from the character of the resource.

Parks and Open Space

Public open spaces such as parks, natural areas and parkways are important to the quality of life within a community. These lands serve many purposes including outdoor recreation and education; buffers between different land uses; flood and stormwater management; habitat preservation; air and surface water quality improvements; protection of groundwater recharge areas; and aesthetics. They can also enhance the value of nearby properties.

Table 12-19 MITW Parks within MITW Reservation

<ul style="list-style-type: none"> • Blacksmith Recreation Park • Keshena Memorial Park & Pavillion • Schoolview Park • Neopit Park • Menominee High School Athletic Field 	<ul style="list-style-type: none"> • Menominee Ropes Obstacle Course • Keshena Recreation Baseball Field • Neopit Athletic Field • Neopit Playground • Middle Village Playground
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Recreational Trails

The MITW has a total of 2.57 total miles of trails within the Reservation.

Table 12-20. MITW Recreational Trails within MITW Reservation

<ul style="list-style-type: none"> • College of Menominee Nation has a nature walk trail, dedicated in December 2004, behind their campus to provide a variety of physical activity options for students and staff to enjoy. 	<ul style="list-style-type: none"> • Pow Wow Ground Trail • South Branch Community Center Walking Trail • Wolf River Dells Trail
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Mitigation Issues and System Level Mitigation Measures

Projects within the proximity of parks, open space and recreational trails need to conduct a visual inspection of the site to determine any adverse impacts (**Exhibits 12-4**).

Parks, open spaces and recreation trails within proximity of the planned transportation projects are listed in **Table 12-21**

Table 12-21. Transportation Projects within Proximity of Parks, Open Space and Recreational Trails	
10	35
20	36
25	

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Environmental Corridors

Environmental corridors are continuous systems of open space created by the natural linkage of environmentally sensitive lands such as woodlands, wetlands and habitat areas that provide important travel ways for a variety of wildlife and bird species. These features are sensitive natural resources; preserving the corridors from development protects habitat and keeps non-point source pollution to a minimum thus ensuring that high quality groundwater and surface water is maintained and habitat is not impaired. The Wolf River corridor is the only environmental corridors within the MITW Reservation. A ¼ mile on either side of the river designates the corridor (**Exhibit 12-2**).

Mitigation Issues and System Level Mitigation Measures

Environmental corridors have the potential to be impacted during construction of transportation projects, thus a careful analysis of environmental corridors within proximity of transportation projects should occur.

Table 12-22. Transportation Projects within Proximity of The Wolf River Corridor	
1	35
4	45

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Other Recreation Facilities

Attractions, beach clubs and other recreational facilities are abundant within the MITW Reservation (**Exhibit 12-5**). A list of the different facilities is listed in **Table 12-23** below:

Table 12-23. MITW Other Recreation Facilities within MITW Reservation

<ul style="list-style-type: none"> • Council Hill Beach Club • Rainbow Pond Beach Club • Sunrise Beach Club • Wood Duck Beach Club • Mallard Bay Beach Club • Trails End Beach Club • Tomahawk Beach Club • Spirit Ridge North Beach Club • Spirit Ridge South Beach Club • Red Cloud Beach Club • Hawks Nest Beach Club • North Star Beach Club • North Star Path Beach Club • North Star Trail Beach Club • Sundance Beach Club • Spring Glen Beach Club • Old South Branch Road Beach Club • Blue Heron Beach Club • Bent Tree Addition Beach Club • Beaver Bay Beach Club • White Flower Beach Club • Tall Moon Beach Club • Otter Ponds Beach Club • Spotted Fawn Beach Club • Lodge Pole Beach Club • Morning Star Beach Club • Thunderbird Beach Club • Straight Arrow Beach Club • Highlands Beach Club • Spirit Island Beach Club • Silver Canoe Beach Club • Red Cloud North Beach Club • Lower Bass Lake Boat launch • Burney Lake Boat Launch • Burney Lake Boat Launch • Cott Lake Boat Launch • Hazel/Crowell Lake Boat Launch 	<ul style="list-style-type: none"> • Lake Elma Boat Launch • Fredenberg Lake Boat Launch • Keshena Lake Boat Launch • La Belle Lake Boat Launch • LaMotte Lake Boat Launch • McCall Lake Boat Launch • Lower McCall Lake Boat Launch • Moshawquit Lake North Boat Launch • Perch Lake Boat Launching • Perch Lake Canoe Launch • Pine Lake Boat Launch • Round Lake Boat Launch • Sand Lake Boat Launch • Sand Lake Boat Launch • Little Sand Lake Boat Launch • Little Sand Lake Boat Launch • St Joseph Church Lake Boat Launch • Stoney Lake Boat Launch • Vejo Lake Boat Launch • Waukau Lake Boat Launch • Rainbow Pond Public Boat Launch • Long Lake Boat Landing & Beach • Legend Lake Public Boat Launch • Legend Lake Boat Launch • Silver Canoe Boat Launch • Floring Campgrounds • Pow Wow Campgrounds • Rainbow Falls • Keshena Falls • Spirit Rock • Menominee Nation Pow Wow Grounds • Moshawquit Lake Public Beach • Legend Lake Lodge Public Beach • Big Smokey Falls • Wolf River Dells • Sullivan Falls • Shotgun Eddie Rafting
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Mitigation Issues and System Level Mitigation Measures

Attractions, beach clubs and other recreational facilities have the potential to be impacted during construction of the transportation projects. While, the facilities themselves may not be impacted, access to the facilities could be restricted. Therefore, construction and timing near these facilities should be coordinated with the appropriate facility. Transportation projects within proximity are listed in **Table 12-24**.

Table 12-24. Transportation Projects within Proximity of Other Recreational Activities

1	35
26	36

NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Air Quality

Air quality, particularly good air quality, is often taken for granted. Clean air is vital to maintain public health. Sound local and regional planning can minimize negative impacts to the air. Development patterns can impact automobile use. As communities become more spread out, the use of automobiles increases dramatically, resulting in more emissions and subsequent decreases in air quality. As residential development moves into rural areas, there are increased conflicts between non-farm residents and agricultural operations that emit odors and dust. Emissions from certain industrial uses also have the potential to impact air quality.

Air quality is measured by a nationwide monitoring system that records concentrations of ozone and several other air pollutants at more than 1,000 locations across the country. EPA "translates" the pollutant concentrations to the [standard] AQI index, which ranges from 0 to 500. The higher the AQI value for a pollutant, the greater the health concern. An AQI value of 100 usually corresponds to the national ambient air quality standard (NAAQS) for the pollutant, meaning that pollutant concentrations have reached unhealthy levels. These standards are established by EPA under the Clean Air Act to protect public health and the environment.¹⁹ Since there are no air monitoring sites in the Menominee Reservation, it is impossible to know for certain that there are no areas within Menominee Reservation which exceed the limits of the National Ambient Air Quality Standard (NAAQS) for ozone or particulates.²⁰ However, according to WDNR, it is unlikely that ozone would be a problem within Menominee Reservation. Particulates could be a problem, but it is also unlikely. The nearest ozone and particulates monitoring sites are in Appleton (Outagamie County), Green Bay (Brown County) and Lake Du Bay (Marathon County).

The Menominee Indian Tribe of Wisconsin Environmental Services Department at one time maintained a small monitoring station in Middle Village (Shawano County) to record mercury deposition and acid rain. However funding for these activities were lost a number of years ago. Overall Menominee Reservation's air quality is good with some particulate pollution likely due to the mill in Neopit and from private wood stoves throughout the reservation. A study a few years ago showed that the reservation does not have a large use of burn barrels.²¹

Cultural Resources

Cultural resources, like natural resources are valuable assets which should be preserved. These resources define a community's unique character and heritage. Included in this section is an inventory of historic buildings, sites, structures, objects, archeological sites and districts.

¹⁹ <http://dnr.wi.gov/air/aq/health/AQIbasics.htm>

²⁰ B. Sponseller, WDNR Personal conversation. June 24, 2009.

²¹ Gary Schuettepelz, Menominee Indian Tribe of Wisconsin Environmental Service phone conversation; 7/26/12

State and National Register of Historic Places

The Wisconsin Historical Society's Division of Historical Preservation (DHP) is a clearing house for information related to the state's cultural resources including buildings and archaeological sites. A primary responsibility of the DHP is to administer the State and National Register of Historic Places programs. The National Register is the official national list of historic properties in the United States that are worthy of preservation. The program is maintained by the National Park Service in the U.S. Department of the Interior. The State Register is Wisconsin's official listing of state properties determined to be significant to Wisconsin's heritage. The inventory is maintained by the DHP. Both listings include sites, buildings, structures, objects, and districts that are significant in national, state, or local history. Sites are chosen based on the architectural, archaeological, cultural, or engineering significance.

There is one item listed on the National Register for the Menominee Reservation (**Exhibit 12-5**):

- Saint Joseph of the Lake Church and Cemetery

Mitigation Issues and System Level Mitigation Measures

Transportation projects near historic buildings and districts may have to exercise caution so as not to damage these more fragile structures during construction. There are no transportation projects near the Saint Joseph of the Lake Church and Cemetery.

Architecture and History Inventory (AHI)

In order to determine those sites that are eligible for inclusion on the National Register, the DHP frequently funds historical, architectural, and archaeological surveys of municipalities and counties within the state. Surveys are also conducted in conjunction with other activities such as highway construction projects.

A search of the DHP's on-line Architecture and History Inventory (AHI) reveals the following properties within Menominee County/Reservation (**Exhibit 12-5**).

- US Government School Complex - Pump house (Keshena)
- US Government School Complex - Laundry
- US Government Agency House
- Saint Joseph of the Lake Church and Cemetery (St. Joseph Church Road)

Inclusion in this inventory conveys no special status, rights, restrictions, or benefits to owners of these properties. It simply means that some type of information on these properties exists in the DHP's collections. As is sometimes the case, many of these properties may no longer exist. AHI is primarily used as a research and planning tool. Like the National Register, this is not a static inventory. Properties are constantly being updated. Information can be found on the DHP web site (<http://www.wisconsinhistory.org/ahi/search.asp?cnty=WS>).

Mitigation Issues and System Level Mitigation Measures

A visual search between the database and transportation projects was not completed. However, as noted above inclusion in this inventory conveys no special status, restriction, or

benefits to owners of these properties. This tool is to be used primarily as a research and planning tool. It is suggested that this inventory be consulted during the planning and design stage to see if any locally significant properties are present and that local historic preservation organizations be consulted.

Note: Only the Saint Joseph of the Lake Church and Cemetery could be identified for mapping purposes and is not within proximity of any planned transportation projects.

Archaeological Sites Inventory (ASI)

An inventory similar to the AHI exists for known archaeological sites across the state: the Archaeological Sites Inventory (ASI). Due to the sensitive nature of archaeological sites, information as to their whereabouts is not currently made available on-line. This information is distributed only on a need-to-know basis. Archaeological sites are added to ASI as they are discovered; discovery is a continual process. For technical assistance and up to date information on sites within a given area, contact the DHP at (608) 264-6500.

Tribal Historic Preservation Office²²

The Menominee Tribal Historic Preservation Office's mission is to protect and preserve the rich cultural heritage of the Menominee people and this includes Menominee language, culture and traditions. This department was created by the Menominee Tribal Legislature in 1991. In 1999, the Historic Preservation Department received the official designation as Tribal Preservation Office (THPO) from the National Park Service under Section 101 (d) (2) of the National Historic Preservation Act (NHPA). This enabled the Tribe to take over the responsibilities of the Wisconsin State Historic Preservation Office in regard to the protection of cultural resources. The THPO is responsible for Section 106 of the NHPA. Any construction project or ground disturbing activity that is funded with federal money or is in need of a federal permit must comply with this act.

The Menominee Tribal Historic Preservation Office is responsible for reviewing the content and sufficiency of any plans to avoid damage to those resources, to ensure the preservation of Menominee resources [16 U.S.C. § 470a(b)(3)(I)]. In addition to reviewing plans, the Menominee Tribal Historic Preservation Office must cooperate with the Secretary, the Advisory Council on Historic Preservation, and other federal agencies, state agencies, local governments, and organizations and individuals to ensure that historic properties are taken into consideration at all levels of planning and development [16 U.S.C. § 470a(b)(3)(F)].²³

Mitigation Issues and System Level Mitigation Measures

Prior to the planning and design stage, the Tribal Historic Preservation Office shall be contacted to determine if there are any known archaeological sites within the vicinity of the proposed transportation project. All projects must start with the Menominee Tribal Historic Preservation Office.

²² <http://www.menominee-nsn.gov/MITW/DepartmentDetails.aspx?departmentID=2600>

²³ Tribal Government of the Menominee Indian Tribe of Wisconsin § 293-2. Establishment of Tribal Historic Preservation Program.

Wisconsin Historical Markers

Wisconsin historical markers identify, commemorate and honor important people, places, and events that have contributed to the state's rich heritage. The Wisconsin Historical Markers Program is a vital education tool, informing people about the most significant aspects of Wisconsin's past. The Society's Division of Historic Preservation administers the Wisconsin Historic Markers Program. Applications are required for all official State of Wisconsin historical markers and plaques.²⁴ There is one historical marker in on the Menominee Reservation, which is listed below (**Exhibit 12-5**).

- Spirit Rock - Hwy 55, 2.5 mi. N of Keshena

Mitigation Issues and System Level Mitigation Measures

During the planning and design stage, a determination should be made to see if there are any historical markers within the vicinity of the transportation projects. There are no transportation projects within proximity of Spirit Rock.

Museums/Other Historic and Cultural Resources

Museums

Museums protect valuable historic resources for community enjoyment. Residents are welcome to learn from the exhibits and amenities they have to offer. There are two museums on the Menominee Reservation (**Exhibit 12-5**).

- **Menominee Logging Museum** - This museum has the largest collection of logging artifacts in the world. Guided tours explore a real logging village where you will visit a bunkhouse, cook shanty, horse barn, blacksmith shop, wood butcher's shop, saw filers shack, and an old time camp office, all fully restored with original tools and equipment used in Northern Wisconsin lumber camps.
- **Menominee Indian Cultural Museum** – The museum will showcase the rich culture and heritage of the Menominee Indian Tribe and display rare and unique artifacts from their past.

The Menominee Tribal Historic Preservation Office serves to protect and preserve the cultural heritage of the Menominee people. This includes Menominee language, culture and traditions. Their highest priority is to revitalize and preserve the Menominee language which considered the mainstay of their identity for future generations of the MITW. They also seek to protect and preserve their valuable cultural resources that have been left by their Menominee ancestors.²⁵

²⁴ Wisconsin Historical Markers of the Wisconsin Historical Society.
<http://www.wisconsinhistory.org/hp/markers/index.asp>. Accessed 8/1/12

²⁵ Menominee Indian Tribe, 2009. <http://menominee-nsn.gov>

Mitigation Issues and System Level Mitigation Measures

During the planning and design stage, a determination should be made to see if there are any museums/other historic and cultural resources within the vicinity of the transportation projects.

Table 12-25. Transportation Projects within Proximity of Museums	
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NOTE: Numbers in the table refer to the Tribal Transportation Improvement Project ID numbers in Table 12-1.

Cemeteries

A listing of cemeteries was obtained from MITW and is shown in **Exhibit 12-5** and **Table 12-26**.

Table 12-26. MITW Cemeteries within MITW Reservation	
<ul style="list-style-type: none"> • St Joseph of the Lake Cemetery • St Anthony Cemetery • St Anthony Church Mausoleum • Neopit Native Cemetery 	<ul style="list-style-type: none"> • West Branch Cemetery • St Michaels Cemetery • Rest Haven Cemetery • Proposed Middle Village Cemetery

Mitigation Issues and System Level Mitigation Measures

Visual inspection has shown no substantial system level cumulative effects of area transportation projects on cemeteries. However, some spot level locations may have projects in close proximity to cemeteries. These projects may require consideration in the design and construction permitting process.

According to the visual review of the maps, there are no planned transportation projects within the proximity of cemeteries.